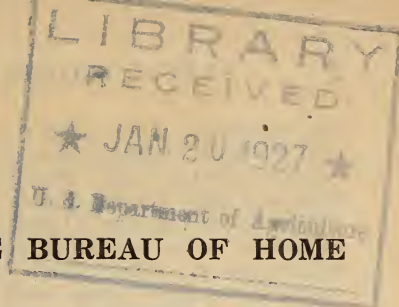


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REPORT OF THE CHIEF OF THE BUREAU OF HOME ECONOMICS

UNITED STATES DEPARTMENT OF AGRICULTURE,  
BUREAU OF HOME ECONOMICS,  
*Washington, D. C., September 1, 1926.*

SIR: I have the honor to present herewith the report of the Bureau of Home Economics for the fiscal year ended June 30, 1926.

LOUISE STANLEY, *Chief.*

HON. WILLIAM M. JARDINE,  
*Secretary of Agriculture.*

The third year of operation of the Bureau of Home Economics was completed June 30, 1926. The purpose of the bureau is to study home problems by scientific methods and to send out the results in such a form that the home makers in every State can put them to practical use. For the past year, \$117,244 was available for study of problems affecting over 20,000,000 American homes. The total sum available for the current year is \$127,244. Care is taken to keep in touch with work under way in other laboratories so as to prevent duplication, and study is made of published results in order that any which are related to home making problems may be so applied. It is hoped by this means to shorten the interval between the discovery of scientific principles and their application in home practice.

There can be no question of the widespread desire for scientific facts on home making both by the family in the home and by the agencies that produce and handle the materials the home requires. The announcement by this bureau of even the preliminary plan for a piece of research brings a flood of requests for results from both these groups.

This increasing spread of home economics information to both producers and consumers is, of course, of great significance to the future of agriculture. Each year shows more clearly that its success does not rest solely on efficient production and distribution of its products. There must be a closer fit between consumption and production. The 20,000,000 American home makers must know how to make

the best use of food, textiles, and other materials the farm supplies. Also it is apparent that more attention must be paid to the standard of living in farm homes. It is a sign in the right direction, therefore, that many groups of people, and particularly home makers, are asking the help of science on home problems.

The work of the bureau is at present confined to three divisions—food and nutrition, economic studies, and textiles and clothing. Detailed studies are needed in the fields of housing and equipment, home relationships, and art in relation to the home, but can not be undertaken until larger appropriations are available.

The bureau has been adequately housed, so far as space is concerned, in one of the buildings of the Government hotels. No extensive changes in laboratory arrangement have been made this year, but equipment has been added as it has become necessary for new pieces of work. The textiles and clothing division has been hampered by the absence of a constant temperature and humidity room, but it has seemed unwise to install such a room in a building as temporary as this. The fact that research in this field is new has made it difficult to obtain the necessary equipment, and in some cases special equipment has had to be planned and made. This has been expensive and has increased the time required for delivery, but will be of advantage to other laboratories developing in this field.

The scientific staff has been strengthened during the past year by additions in the fields of economics, and textiles

and clothing. The number of scientific workers in proportion to clerical and custodial help has been increased. This has been made possible by reorganization of the clerical and custodial forces so as to get more economical utilization of their time. Arrangements have been made with George Washington University and with the University of Maryland by which specially prepared students have been used as student assistants. By this means we have obtained efficient sub-professional service and at the same time have contributed to the training of younger workers. Cooperative relationship has been established with the University of Maryland by means of which the facilities of our laboratories are to be placed at the disposal of their graduate students and they are to be allowed credit for approved pieces of work done in our laboratories.

Through the Office of Experiment Stations we have kept in touch with home economics research initiated in the States under the Purnell Act. Advice and help have been offered and personal visits paid the stations by members of the staff, to aid in planning new projects. Members of the staff have also served on the committees appointed to arrange for cooperative research in home economics under the Purnell Act. State workers undertaking new pieces of work have been sent here for conference and some have stayed for several days' work in the library or laboratories, so as to get in touch with the literature or the methods of work.

Cooperation with the women's organizations has been continued. Special material has been prepared for use in club programs and in their official organs. Plans are under way to use the various organized groups of women in the collection of data essential for a scientific study of home-making.

### LIBRARY

The library is growing in size and usefulness. Our aim is to make it not only a service library for the staff but the best available reference library on home economics in the country. Since books can be obtained quickly from the Department of Agriculture library and the Library of Congress, this is possible without having a large number of books on our own shelves.

Some work has been started on the preparation of bibliographies that are much needed in this field. A bibli-

ography on the fitting of shoes and other footwear is nearly complete. The librarian has begun work on a complete list of the printed contributions of the bureau and the preceding branches of the department out of which the bureau grew. Such a list is of great practical use as well as of permanent historical value.

### FOOD AND NUTRITION

The work of this division has been very much hampered by lack of personnel. The expenditures in this field have had to be curtailed in order to provide for the development of the other lines of work. The sum available has only served for carrying on projects already under way, and there has been no opportunity for development of new lines of work that are very much needed.

### COMPOSITION OF AMERICAN FOOD MATERIALS

The data on food composition assembled for the revision of Office of Experiment Stations Bulletin 28, "Chemical Composition of American Food Materials," have been studied to determine figures that represent the proximate composition of foods that are important in the American diet. The study of meat started last year has been continued. New average figures on meat composition have been reached by statistical study of all available data. These have been associated with our present established commercial grades and represent more nearly than the earlier figures the composition of meat as purchased on the market. This compilation has shown such a regular coordination in the different constituents of meat that it is believed considerable saving can be made in the number of chemical analyses required in the cooperative study of meat production conducted by the department and the State experiment stations. The work on this section has been given precedence over other sections of this bulletin because of its close relation to studies under way, and the results have been prepared for publication as Department Circular 389, "Proximate Composition of Beef." A table on the yield of wholesale cuts of beef by grades was prepared for the 1925 Yearbook.

### MINERAL CONSTITUENTS OF FOOD

#### UTILIZATION OF CALCIUM FROM SPINACH

Among the requirements for a satisfactory diet, the supply of calcium is



more likely to be inadequate than that of any other mineral. Even though a food contains enough calcium to furnish the estimated body requirement there still remains the question as to whether the body utilizes it. Spinach, one of the most widely used leafy vegetables, contains calcium in an insoluble form and also oxalic acid. A metabolism experiment with seven normal women as subjects was carried out to compare the utilization of the calcium of spinach with that of milk when used in a mixed diet. It was found that the calcium of spinach is well utilized. The results of this study have been prepared for publication and will be sent to one of the scientific journals.

#### LOSSES OF CALCIUM IN COOKING

An experiment is in progress to determine the effect of the presence of salt in the cooking water upon the loss of minerals, especially calcium, during cooking.

#### VITAMIN STUDIES

In order that scientific facts on the relation of vitamins to health may be applied in the preparation of everyday menus, additional information must be had upon the occurrence of vitamins in human foods, and the influence of various methods of handling and preparation upon vitamin content.

Through the cooperation of the Office of Experiment Stations, Sybil L. Smith, specialist in biochemistry in that office, has compiled a table showing the distribution of vitamins A, B, and C in about 150 food materials, and a selected list of references to the literature reporting their occurrence and the technic of vitamin studies. This material has been issued in mimeographed form by the bureau, particularly for the use of those conducting research on vitamins in the State experiment stations and colleges.

Special attention has been given during the past year to the development of the details of methods for determination of vitamin content, since a number of the laboratories initiating work in this field have been looking to us for help. The question of the adequacy of yeast used as a source of vitamin B was raised. Several products were tested, and the quantity of one necessary to supply an optimum of vitamin B in the diet was determined.

A method for vitamin D determination has been developed. The technic of using the ultra-violet lamp to supply the vitamin D necessary in vitamin A determinations has been worked out.

#### LETTUCE

The comparison of the food values of green and white lettuce leaves has been under way since the establishment of this laboratory. The stock animals of the laboratory have been supplied one or the other form of lettuce in addition to the basal diet. This data will soon be ready for summary and conclusions.

As a supplement to this long-time study, the vitamin A and B content of lettuce has been determined, and experiments on the vitamin C content are almost completed.

#### HONEY

In cooperation with the Bureau of Entomology, the determination of the vitamin A, B, C, and D content of one sample of honey has been completed. A start has been made on the study of another sample, which differs widely in color. Previous studies on the vitamin content of honey have been sporadic, and it is our hope in this case to study completely sufficient samples so that definite statements can be made.

#### COD-LIVER-OIL CONCENTRATE

The vitamin A content of a commercial cod-liver-oil concentrate has been completed and the vitamin D content of this concentrate is now being determined.

#### DEMONSTRATION WORK

Groups of rats have been placed on diets recommended by the Ohio extension service, to show the value of additions of milk and fresh vegetables to the diet. Pictures have been taken at various stages for demonstration purposes, and the skeletons from one set of animals have been mounted for a permanent exhibit.

#### PROBLEMS IN FOOD PREPARATION

##### SOFT-WHEAT FLOUR

Work on flours from three classes of wheat was continued to show the variations required in proportions and methods of handling. These confirmed

the conclusions of last year that the softer flours yield more successful results when the proportions of sugar and yeast are slightly increased; also that the softer flours gave best results when the mixing was not too severe. A member of the staff of the bureau has worked with the departmental committee on standardization of bread-making tests for hard-wheat flour.

#### COOKING OF MEAT

16 In connection with the cooperative meat-production project considerable work has been done toward developing a standard method for cooking and testing the flavor of meat. It has been observed that beef roasts brought to a final temperature of from 61 to 63° C. are of desirable medium-doneness. The average rise in temperature after removal from the oven was 5°. Successful results in roasting were obtained when after the preliminary searing, usually at 250° C., the temperature was lowered to 125° C. for the remainder of the period of cooking. At this temperature the roasts required approximately 20 minutes per pound to reach the required temperature. This time can be shortened by cooking at a higher temperature, as 150 or 175° C., but the evaporation and dripping losses increase and there is less uniformity of doneness, as compared with meat cooked at the lower temperature.

Since lamb is generally liked better done than beef, it was found desirable to cook it to a temperature of 83° C. at the center of the roast. At this internal temperature there is less rise after removal from the oven. When the cooking was completed at 125° C., 45 to 60 minutes per pound was required. Increasing the temperature to 175° C. decreased the time per pound to approximately 26 minutes but increased the evaporation loss and yielded a less palatable product. So many different factors help determine the time required per pound that the above figures can only be looked upon as comparative. The more bony roasts, such as the shoulder cuts, required even longer times, with higher evaporation.

In connection with this work considerable time has been spent on the study of methods of controlling oven temperatures and the variations in temperatures in the different portions of the oven. This preliminary study has indicated the need for more detailed work on this problem.

Some of the cooperators report a higher searing temperature desirable and suggest that the cooking be finished at an even lower temperature than 125° C. The practical question presents itself as to the best methods for the housewife to use. It seems possible that the searing can be done more economically under a broiler and the cooking finished in an oven regulated at the low temperature found desirable. The present recommendation to sear in the oven at a high temperature, which must be reduced markedly for the completion of the process, is decidedly wasteful of fuel.

The whole question of the temperature variation in different portions of the oven is perhaps closely associated with the degree of ventilation of the oven. The influence of an unventilated oven upon flavor in the roasting of meat needs to be studied.

The roasts were all scored for their palatability by an interdepartmental committee. As the result of this work a score card for the assignment of numerical values to the different factors which affect palatability of meat has been prepared. The results of these studies will be a guide in developing methods of production which will yield the types of beef demanded by the market.

#### VEGETABLE COOKERY

Work on the cooking of vegetables has been continued, with special attention to methods which will preserve the mineral and vitamin content. It is hoped that during the current year results of the work during the last few years may be issued in the form of a brief and practical bulletin on vegetable cookery.

#### QUANTITY RECIPES AND FIGURES ON WASTE

As a by-product of other work of the bureau, a number of recipes for quantity cooking have been developed and will be published as opportunity permits. Records have been kept of the amount of refuse in the preparation of all foods used in the laboratory. These are being summarized, and will be used in connection with the compilation of the figures on the chemical composition of food materials and in the estimates necessary for the dietary survey.

A large proportion of the time of the staff of the experimental kitchen has been spent in testing products



sent in by other bureaus and in checking recipes to be sent out in press releases, over the radio, and in answer to miscellaneous requests.

## HOME PRESERVATION OF FOODS

### CANNING

The work on home-canning problems has been continued. The bulletin on home canning of fruits and vegetables, which has been in preparation for the last two years, was released in May, and up to the present time nearly 250,000 copies have been distributed. Special work has been done on canning asparagus and different varieties of beans, and the spoilage records substantiate our earlier conclusion that these vegetables should be processed under pressure.

A list of the problems in home canning considered most pressing by the extension agents has been collected and will serve as the basis for further work. The experimental records available on this subject are being assembled, and any problems not yet solved will be made the basis of our experimental program.

Work is under way to find the heating curves for vegetables packed hot in glass containers of different sizes as compared with tin cans. Special equipment has had to be ordered for this, so the work has been delayed.

Since the recommendations in regard to the removal of fat from meat in canning are so conflicting, a series of experiments was run comparing the keeping of lean lamb with some containing a large proportion of fat. This has been canned in accordance with the methods previously found to be successful and will be checked during the coming winter.

Special requests have come from home demonstration agents for directions for canning whole-wheat cereal and suet puddings. These have been prepared and canned and will be ready for checking as soon as a satisfactory interval of time has elapsed so as to be sure the products are keeping.

Some samples of vegetables canned during the years 1919 and 1922 were opened and scored. It is hoped that during the coming fall data on spoilage with different temperatures and times of processing can be prepared for publication.

Fresh black-eyed peas were canned and compared with the cooked dried peas. There was not sufficient difference in the quality of the product to justify the time required for canning.

Brining as a method of home preservation of vegetables has been studied and methods have been worked out by means of which these products can be used as substitutes for fresh vegetables, as well as in pickles. Special attention has been given to the development of satisfactory pickle recipes.

Since many complaints of color changes in canned fruits came to the bureau last year, various fruits were canned in glass jars and in lacquered and unlacquered tin cans. These have been opened and scored. The highly colored fruits showed least change when canned in glass, and less change in the unlacquered than in the lacquered tins. The unlacquered tins were badly corroded in some cases. The fruits with little color, as peaches and pears, showed less change in tin than in glass. There was a tendency for these to become darker when canned in glass. Study of the causes for this is being continued.

### REFRIGERATION

During the past year studies of electric refrigeration for the home have been begun. The attack has been from the physical and engineering side. One mechanical-refrigerating unit, lent and serviced by its manufacturer, has been installed in the bureau in a modern cabinet lent by its maker. Records have been kept of the temperature of the room, the refrigerator temperature, and the amount of current used. The outfit has operated perfectly without attention other than a periodical cleaning of the food space of the chest and an occasional defrosting of the cooling unit therein, oiling of the motor, and wiping of the machinery and cooling coil. Records of the electric current consumed, of the operation of the motor, and of the temperature of the room, and of points in the box have been accumulating for several months but have not yet been interpreted.

## ECONOMIC STUDIES

### FOOD CONSUMPTION OF FARM FAMILIES

The analysis of the diet of farm families which was started last year has been continued. The data for this study are taken from the schedules of the survey of farm standard of living made jointly by the Bureau of Agricultural Economics and this bureau.

During the year the average quantity and cost of each foodstuff con-

sumed by farm families have been determined for seven States, covering 1,837 families (Alabama, 200; Kansas, 406; Kentucky, 365; Missouri, 178; North Carolina, 220; Ohio, 382; Vermont, 86). The nutritive value of these average diets has been calculated in terms of calories, protein, calcium, phosphorus, and iron, and the distribution of the total calories and the total cost among the various food groups has been shown.

Two preliminary reports of these results have been prepared, one for Kansas, Kentucky, Missouri, and Ohio, now ready for mimeographing, and one for North Carolina, sent only to cooperators in that State. In these reports comparisons have been made with results from other dietary studies and with standards of good nutrition.

For three States, Alabama, North Carolina, and Vermont, the diet of each family has also been analyzed from the standpoints of nutritive value, cost, and the relation of these to the amount of food furnished by the farm. In this analysis, the short-cut method of calculating nutritive value, which was worked out last year, has been used.

During 1926-27 the diets of the 382 Ohio families will be analyzed. This will bring the total number of individual family dietaries analyzed to 1,253 (Alabama, 200; Kentucky, 365; North Carolina, 220; Ohio, 382; Vermont, 86). The average consumption figures in quantities and costs of each foodstuff will be found for the remaining States for which reliable food data are available. Probably about 12 States, including approximately 3,000 families, will be covered in all. Preliminary reports will be published for the five States for which the individual family diets were analyzed, and the results of all of the work on the farm-food schedules will be brought together in a bulletin.

#### SHORT-CUT METHOD OF CALCULATING THE NUTRITIVE VALUE OF DIETS

The short-cut method of calculating the nutritive value of diets has been further checked during the year against the usual long method. Figures on the average food consumption of large groups have been used for the testing. The results fall within a few per cent of those obtained by the long method, although the time required is only one-fourth that consumed by the long method. The method, therefore, has been written

up and sent in mimeographed form to the colleges and universities, where it is being given further trial. During the coming year it will be revised in the light of these results and made available in printed form, with explanation of its advantages and limitations.

#### SUMMARY OF FOOD-CONSUMPTION STUDIES MADE IN THE UNITED STATES

Before new studies are started of the food consumption of the American people, it seemed advisable to review carefully all of the work previously done in order to determine what parts of the field are most in need of further study and what methods of study will prove most successful. Such a review has therefore been made, and the results brought together in a convenient summary, showing in tabular form the method used in each study for collecting the data, the extent of the analysis, the number and types of families studied, and similar facts. This summary, which has been put out in mimeographed form, has proved most useful in two national conferences on studies of food consumption, one held in Washington, D. C., in April, under the auspices of the Bureau of Home Economics, and the other at the annual meeting of the American Home Economics Association, in Minneapolis, Minn., in June. During the coming year a more detailed report will be prepared.

#### FOOD-CONSUMPTION DATA BY THE ACCOUNTING METHOD

Both the summary of previous food-consumption studies and the results of the study with farm families by the survey method point to the need of new data obtained from actual records of food consumption. Forms and directions have therefore been drawn up for food accounts by means of which housewives can record from day to day the quantity and cost of each foodstuff consumed by the family and the amount of edible waste. The records will usually be kept for periods of two weeks, at from two to four seasons of the year. In order to direct and encourage the housewife in the work, several visits will be made to her by a field agent.

This accounting method is now being used by a number of colleges and universities for collecting data on food consumption of individual families or of institutional groups. During 1926-27



it will be further tested and its results compared with those obtained by the survey method and also by an accounting method in which the records are kept by a field agent rather than by the housewife. On the basis of these comparisons of methods a more extensive collection of food data will then be started.

#### CLOTHING EXPENDITURES OF FARM FAMILIES

The survey of farm standards of living has given data on the clothing as well as on the food expenditures of farm families. During the year these figures have been analyzed to show the kind and cost of clothing purchased by the various members of the farm family and some of the factors influencing these expenditures.

For 1,337 families the expenditure for each article of clothing purchased during the year was found for husbands and wives and for sons and daughters of seven different age groups. The resulting table shows the number of persons purchasing, the average number of articles of each kind purchased per person, and the average cost of each article.

These figures are considered sufficient for this detailed tabulation by articles of clothing. A larger number of families are being used, however, to show the total yearly expenditure for clothing for each of the 15 age and sex groups, and the relative expenditure for each group in terms of the husband's expenditure. The distribution of the total expenditure among six different classes of clothing is also being found. This tabulation, which will soon be completed, will include 2,010 families, from seven States, with separate averages for each State.

In order to determine the influence upon clothing expenditures of the size of the family income the schedules (except those of Kansas) are classified in four different groups, according to the size of the expenditure per family for all items of the family living. This method of classifying, which ignores differences in size of family, was found to serve the purpose as well as a classification by total expenditure per person, and was used because it was the quicker method. The influence of climate, of marriage, and of size of family upon clothing expenditures have also been investigated. Some of the results of this work have already appeared in a preliminary report on "Average Quanti-

ties and Costs of Clothing Purchased by Farm Families."

On the basis of this study of actual clothing expenditures, suggested clothing budgets have been drawn up for the farm operator and home maker and for sons and daughters of seven different age periods. These budgets conform to a standard of living for the farmer comparable to that described in budgets for the industrial family as a "health and decency level." This material has been presented in a report which will soon be ready for mimeographing. In the fall of 1926 all the work on this clothing study will be completed and the results brought together in a bulletin.

#### METHODS OF HOUSEHOLD BUDGETING AND ACCOUNTING

The need of satisfactory forms for the planning and recording of family expenditures is at present keenly felt, both by those assisting the individual home maker in the management of the family's finances and by research workers studying standards of living. Since the form of account book most widely used to date has proved unsuccessful with a great many families, a number of alternative forms have been prepared and tested out with farm and with city home makers.

The study has considered not only methods of recording cash expenditures but also methods of planning or budgeting expenditures and of recording income receipts, supplies furnished by the farm, and other special items. The part which the home maker plays in the management of expenditures and the use of checking and of charge accounts has also been determined, as the practice in these respects influences the type of accounting which will prove successful.

As a result of this study two forms of account books have been selected. One is suitable for use by home makers who have some experience or aptitude in household accounting and are able to plan and record their expenditures without direct assistance. The other form, which is exceedingly simple, is prepared for home makers who can not be expected to do more than enter their expenditures in journal fashion without classification. With these home makers frequent visits by a field agent are necessary to encourage and assist in the keeping of the accounts and to classify and analyze them with the home maker so that they may serve as a guide to wiser spending.

A bulletin presenting the results of this study and illustrating and explaining the forms of account books is now in preparation. Meanwhile, to meet the many requests for information on methods of handling household finances, a small circular, "Planning Your Family Expenditures," was printed.

#### COMPARISON OF METHODS OF COLLECTING DATA ON FAMILY EXPENDITURES

Most of the data on family expenditures so far collected by various agencies have been obtained by the survey method, in which the home maker recalls the previous year's expenditures in response to questions put by an investigator. Although it is recognized that some error must be present in such figures, the extent and nature of the error are not known. Before collecting new data on family expenditures, therefore, it has seemed desirable to compare the figures obtained by the survey schedule with those obtained from accounts kept by home makers. Plans and blanks for such a study have therefore been drawn up and will be first used in July, 1926, with about 50 farm home makers in Maryland.

On the basis of the results of this first study, the plans for the study will be revised where necessary and figures will be obtained from home makers in other localities, either with or without the "control" schedules. It is probable that the two sets of expenditure figures will be needed from about 100 home makers in all. In making this study the question of food data will be given special attention, and there will be close cooperation between this division and the division of food and nutrition.

#### SUGGESTED BUDGETS FOR FARM FAMILIES

It is the almost unanimous opinion of those who are assisting the home maker in the management of her family's finances that some sort of "ready-made" budget is necessary as a starting point. For although each home maker must work out her own plan of expenditure, suited to the particular needs of her family, she is usually unable to proceed without a printed budget from which to work. Such suggested budgets have been made available for city families by the budget-service departments of banks and by social workers, but no material whatever has been published for farm families.

The preparation of "suggested" budgets for farm families of various sizes and income has therefore been started and will be completed during the coming year. The data on family expenditures for several thousand farm families, obtained by the survey method, will form the chief basis for this work, supplemented by household accounts from the Maryland study mentioned above and from the extension departments of several States. These figures on actual expenditures will be checked for adequacy and balance against our present scanty knowledge of the relation of expenditure to health. Where scientific knowledge fails, common sense and common standards will be called upon. For the food and clothing items the assistance of specialists in these lines will of course be obtained.

#### EXPENDITURE SCALES BY AGE AND SEX

In comparing the expenditures of one family or group of families with other families or groups, allowance must, of course, be made for differences not only in the number of persons in the family but also in age and sex. The most satisfactory method of making this adjustment is by the use of scales of relative expenditure, in which the cost of the "living" of each individual is expressed in terms of the average married man's expenditure. The number of "adult-male units" to which each family is equivalent can thus be found, and the total family expenditure can then be reduced to the expenditure per "adult-male unit."

Such expenditures scales have already been drawn up in the division for the food and clothing expenditures of farm families. The remaining items of family expenditure will be considered during the coming year, using the data from the survey schedules and the household accounts mentioned above. The scales for the various items will then be thrown into a single scale, covering all family expenditures. After testing the accuracy of the figures, a report of the work will be issued.

#### PRESENT USE OF TIME BY HOME MAKERS

The study of the present use of time by home makers, which was started by the division in 1924, was selected as a national project by the Purnell committee on rural home-management studies. In consequence, four States have undertaken the study



under Purnell funds during the past year—Oregon, Rhode Island, Idaho, and Washington. All of these States have received from the division the blanks and instructions for collecting the time data and the classification of home makers' activities, which we have developed. Detailed directions for editing, classifying, and tabulating the records are also being sent to the State workers.

Two new forms have been added during the year to the material used in the study, one a second form for the recording of time expenditures by the housewife and the other a form for the plan or schedule of housework. The blanks for recording help and for reporting supplementary information and the instructions to the home maker have been considerably revised and are now in final form.

Emphasis has been placed during the year on working up the procedures in editing, classifying, and tabulating the records. These procedures have been written up in detail in order that the records may be handled in the same way by the various bureau and State workers and the results from the different sets of records made comparable.

At the present time satisfactory weekly records are on hand from 217 home makers, in addition to several hundred which are soon to be sent to us from two of the Purnell studies. During the coming year the classification of these and probably of between 100 and 200 new records will be completed, and the analysis of the records of the farm home makers and possibly of the town home makers, will be made and the results presented. For some types of home makers, however, the work will doubtless run into the year 1927-28, unless the Purnell workers obtain and tabulate records from a large number of home makers, thus reducing the number which we must handle.

#### TIME SPENT IN CARE OF INFANTS

In addition to the time study of all of the home-maker's activities, described above, more detailed studies are needed of the time spent in specific tasks. Of these none are so important as the care of children. The study of the time spent in the care of infants, started last year, has therefore been continued to the extent of obtaining 20 additional weekly records, which brings the total number of records to 47. The records collected last year have been assembled for a short

article, which appeared in the March number of the Journal of Home Economics. During the coming year more records will be obtained and a final report made for children under 12 months of age. At some later time the study will be extended to include children in their second and third years.

#### TEXTILES AND CLOTHING

In this division a beginning has been made in the scientific study of the problems of home laundry work. Some time has been required to develop a satisfactory and scientifically accurate method for determining the most effective temperature for the removal of soil from textile fabrics. Methods of removing the sizing from fabrics and artificially soiling them have been studied and satisfactory methods chosen. A special battery of washing machines has had to be made for this study. This has been designed so that it can be kept at a constant temperature. Several methods for determining the amount of soil removed during washing have been studied, and since this is a new field of work it has been decided to use in the final study the three most satisfactory methods, one colorimetric, one photometric, and one involving weighing. This will not only furnish data as to the amount of soil removed but also information as to the most satisfactory method of determining this.

A study of the literature on the scorching temperature of textile fabrics during ironing has been made and the apparatus for the experimental work is now being assembled.

A study of sizing formulas for home laundering is being made to determine the advantages of using various kinds of starch and additional ingredients in starching mixtures. Many formulas of this kind are advocated in books on laundering and commercial sizing, with contradictory statements as to their value. The qualities which are usually discussed more or less empirically in this connection are softness, smoothness, penetrability, adhesiveness, stiffness, and pliability. Attention is directed at the present time to the last three.

The method reported in the literature by Grimshaw for determination of stiffness has proved satisfactory for measuring this quality. Details of applying the starch and preparing the fabric in order that uniform conditions may be maintained have been worked out and preliminary tests with

commercial starches made. As soon as starches of known origin are available, the final runs can be completed.

A large amount of work has been done on developing a method of measuring pliability. Preliminary studies based on the "feel" of the fabric, which is the only method reported, showed the impossibility of getting accurate results in that way. A thorough investigation of instruments and methods used for similar purposes in related fields, such as paper, paint, and glue testing, was made, but none of these proved usable. It was finally decided that the only satisfactory method would be to prepare films of the starch and test the pliability of these on an instrument, the principle of which would be similar to the M. I. T. paper folding endurance tester. Preliminary work has developed the method of preparing these films in a satisfactory manner and an instrument delicate enough to test them is being built. It is expected that this instrument will be useful for the testing of the "cracking" of silk, and for the study of paint and glue films as well as starch. It thus should be a valuable contribution in the field of physical testing instruments.

Adhesiveness is another property for which no method of measurement has been developed. Investigation of glue-testing instruments, including those at the forest products laboratory at Madison, Wis., has given some helpful suggestions, and preliminary tests have been made with various kinds of starch joints, using fabric as a foundation. The strength of these joints is being determined in a tensile-strength machine.

Since some authorities hold that the variety of the cereal or tuber from which the starch is taken and the maturity of the plant at time of harvest affect the properties of the starch, it seemed imperative that the origin and history of the starch being tested should be known. Effort was made to obtain such starch on the market and through the various bureaus of the department. This was found to be impossible, and it became necessary to prepare the starch on a laboratory scale. This was done at the color laboratory of the Bureau of Chemistry, where semicommercial apparatus large enough for the purpose was available.

Wheat starch was made from wheat flour milled at the Kansas Experiment Station from Kharkof wheat. Potato starch was made from Russet

Rural potatoes selected by a member of the Bureau of Plant Industry. Cornstarch was made from Boone County white corn grown at Arlington Experiment Farm, near Washington. Fortuna, Early Prolific, and Blue Rose rice were obtained through the Louisiana Experiment Station. Starch from each of these three varieties is to be compared, since it has been learned that an effort is being made to develop an American rice-starch industry, and results on these chief American-grown varieties would be very helpful in that connection. Arrangements have been made through the Hawaii Experiment Station for canna starch, with which much experimentation has been done by the department. About 150 pounds of starch from these sources was prepared and is now being purified.

#### GARMENT FITTING

The study of garment fitting mentioned in the 1925 report is being continued. The experimental work is under way and a plan for taking silhouettes of characteristic figures has been formulated in order to obtain illustrations to be used in the publication of the results.

The study of the home-sewing practices of women throughout the country is also being continued. Approximately 1,100 questionnaires have been tabulated. The results will show the problems upon which the women need help.

The project dealing with designs in children's clothing, which was started last year, was discontinued because of pressure of other work and has recently been taken up again. The work done by other institutions in the meantime has changed our plans somewhat and the actual scope of the problem can not be stated until the survey of the literature now under way has been completed.

The anthropometric study started last year was discontinued for the time being because of lack of funds. It was then planned to take body measurements of individuals of both sexes from 2 to 21 years of age. The results were to be used as a basis for pattern making and construction and fitting of garments. The great interest shown during the past year by manufacturers of patterns and ready-to-wear clothes as well as the needs of women expressed through the clothing specialists of the extension service make such a study of extreme importance at this



time. It is hoped that plans for carrying it forward can be developed this coming year in connection with some work to be done on the preschool child. This will further aim to establish measurements of the normal American child which will be of anthropological value as well as of help in the formulation of standards of good nutrition.

At the request of the National Committee on Prisons and Prison Labor, a member of the staff was sent to New York City and to the New York State Reformatory for Women at Bedford Hills, N. Y., to advise with them in developing suitable clothing for the inmates of such institutions, which might be developed in the small factory located there. The following was accomplished:

Four sample styles of underwear were made, of which one was chosen by reformatory officials for wear by inmates. Charts were made for use in the cutting out of all children's clothing, adult dresses, and underwear, in order that the material might be used as economically as possible. Patterns were supplied in five sizes each for brassieres, combination underwear, costume slips, and dresses, three sizes each for bloomers and middies to be used as athletic suits, two sizes of children's dresses, rompers, and bloomers, one size baby slip, and one size baby jacket. Officials in the garment industry in New York City were interviewed in order to learn as much as possible concerning the women's underwear industry since the reformatory was particularly interested in that phase of the problem and also in order to make as many contacts as possible in the interest of the anthropometric study we hope to undertake.

The printing of Farmers' Bulletin 1449, entitled "Selection of Cotton Fabrics," was completed and almost at once the first edition was exhausted, so great is the demand for information on the selection of textiles. A similar bulletin on wool is in preparation and will be followed by one on silk.

Farmers' Bulletin 1497, entitled "Methods and Equipment for Home Laundering," has been prepared to replace the former bulletin on home laundering, and is now printed and available for distribution.

A revision of Farmers' Bulletin 861, entitled "Removal of Stains from Clothing and Other Textiles," and a farmers' bulletin on "Principles of Window Curtaining" have been submitted for publication.

As dress revues and various other contests in clothing selection and con-

struction have gained in popularity in school and extension programs, leaders have been asking where they could get standard score cards. The great variety of cards now being used has been a serious handicap to many, particularly in country-wide elimination contests. To meet this need 22 score cards for judging various types of contests have been compiled by this division and are ready for issuance in mimeographed form. These make no claim to being ideal, but it is believed that they embody the best points of all those now in use and that they give greater educational value to such contests.

The lantern slide set entitled "What Shall I Wear," and the syllabus and notes to accompany it, has been completed and is now being distributed by the Office of Cooperative Extension Work. This gives the elementary principles of costume design and illustrates them with costumes for mature women. The slides are therefore particularly useful for clubs of rural women organized through the extension service.

Material for another lantern slide series entitled "First Aid in Window Curtaining" has been submitted to the Office of Cooperative Extension Work. The necessary lettering and drawing is now being completed there.

This division has been responsible for abstracts to current literature on textiles and clothing, published in the Journal of Home Economics every other month.

## PUBLICATIONS AND PRESS MATERIAL

Technical and popular information reporting the work of the bureau have continued to be sent out in the form of bulletins, of articles for periodicals, scientific journals, and newspapers, and of releases for broadcasting by radio. The response from this material is an immediate and increasing demand for more. The first editions of several bulletins have been exhausted almost as soon as they came from the press.

During the past year the following publications have been issued in the regular series of the department:

Selection of cotton fabrics. Ruth O'Brien. Farmers' Bulletin 1449.

Canning fruits and vegetables at home. Louise Stanley. Farmers' Bulletin 1471.

Methods and equipment for home laundering. Division of Textiles and Clothing. Farmers' Bulletin 1497.

A guide to good meals for the junior home maker. Ruth Van Deman and

Caroline L. Hunt. Miscellaneous Circular 49.

The following publications are in press:

Proximate composition of beef. Charlotte Chatfield. Department Circular 389.

Planning your family expenditures. Chase G. Woodhouse. Miscellaneous Circular 68.

Stain removal from fabrics: Home methods. Division of Textiles and Clothing. Farmers' Bulletin 1474.

Manuscripts for two more farmers' bulletins have been submitted for publication:

Principles of window curtaining. Mary Aleen Davis.

Convenient kitchens. Greta Gray.

The preliminary reports and subject matter issued in mimeographed form are as follows:

Average quantities and costs of clothing purchased by farm families.

Edna Clark, Bureau of Home Economics, and E. L. Kirkpatrick, Bureau of Agricultural Economics.

Vitamins A, B, and C. Sybil L. Smith, Office of Experiment Stations.

Two hundred special articles and press releases describing the work of the bureau or reporting some special piece of research have been sent to newspapers, magazines, and scientific journals. Included in these was a special series distributed in cooperation with Better Homes in America during

Better-Homes Week to the communities where demonstrations were held. An added feature of the information service this year was a biweekly series of radio releases of approximately 2,500 words each, popularizing the scientific facts on nutrition and food selection and preparation. Twenty-six such releases were sent during March, April, and May to 38 stations for broadcasting in various parts of the United States. The response to these releases has been so favorable that it is planned to continue them during the coming winter.

#### EXHIBIT MATERIAL

Help was given in the preparation of exhibits for the National Livestock and Meat Show, and one of the specialists from the bureau went with the exhibit.

Considerable time was spent by specialists in the bureau in the preparation of exhibits for the Sesquicentennial Exposition.

In cooperation with the extension service a series of posters on kitchen arrangement has been planned and is now being prepared.

Some time has been spent in planning educational films on home economics subjects. One on child nutrition has been started, and it is hoped that it and at least one other will be completed during the coming year.